THREE

3

Pedestrian Design Guidelines

3. PEDESTRIAN DESIGN GUIDELINES

I. State and Federal Guidelines

The design of many streetscape elements is regulated by state and federal law. Traffic control devices must follow the procedures set forth in the Manual of Uniform Traffic Control Devices (MUTCD), while elements such as sidewalks and curb cuts must comply with guidelines implementing the Americans with Disabilities Act (ADA).

A. Manual of Uniform Traffic Control Devices

The City of Cambridge follows the procedures and policies set out in the MUTCD. Traffic control devices include traffic signals, traffic signs, and street markings. The manual covers the placement, construction, and maintenance of devices. Under the guidelines, all devices must

- fulfill a need
- command attention
- convey a clear, simple meaning
- command the respect of all road users
- give adequate time for proper response

The MUTCD emphasizes uniformity of traffic control devices to protect the clarity of their message. A uniform device conforms to regulations for dimensions, color, wording, and graphics. Uniformity also means treating similar situations in the same way.

B. Americans with Disabilities Act

Title II of the Americans with Disabilities Act (ADA), signed into law in 1990, is a civil rights act that prohibits public entities from discrimination on the basis of disability. Newly constructed facilities must be free of architectural barriers that restrict access or use by individuals with disabilities.

The City of Cambridge uses two technical standards for accessible design: the Americans with Disability Act Accessibility Guidelines (ADAAG), adopted by the Department of Justice for places of public accommodation and commercial facilities covered by Title 3 of the ADA, and the Massachsuetts Architectural Access Board (MAAB), 521 CMR.

II. The Pedestrian Path of Travel

A. Sidewalk Zones

Many of the design guidelines in this section are for elements that are located in the sidewalk portion of a street's right-of-way. The sidewalk can be divided into three zones; the width of each zone depends in part on the overall width of the sidewalk.

The Curb Zone

The curb zone is the portion of the sidewalk immediately adjacent to the curb. Most street furniture, poles, and plantings are installed in this zone.

The Travel Zone

The travel zone is the portion of the sidewalk that is used for pedestrian travel parallel to the street. This zone should always be kept clear of obstructions.

The Building or Comfort Zone

The building zone, also referred to as the comfort zone, is the portion of the sidewalk that is adjacent to the property line. In business districts, window shoppers often use this zone, as do people waiting for friends or seeking cover from the rain. This zone can also be used for café seating or merchandise displays as long as they do not intrude on the pedestrian path of travel.

B. Sidewalk Width

The Americans with Disabilities Act mandates a minimum width of 3 feet of unobstructed sidewalk passageway. Public sidewalks less than 5 feet wide are required to include a 5-by-5 foot passing space every 200 feet. Most people have at least a temporary disability at some time in their lives, so making sidewalks usable by people with disabilities improves them for everyone.

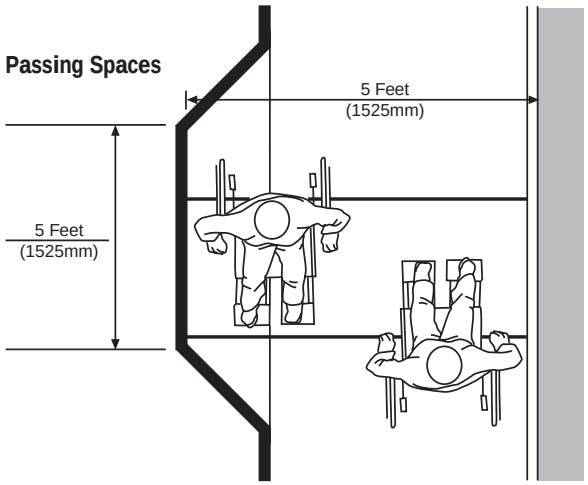

Figure 1: Passing Spaces.

Options for widening sidewalks and narrowing streets should be considered whenever roads are reconstructed. This is especially important on streets with heavy pedestrian traffic. Sidewalk widening should only be done after ensuring that cyclists are accomodated in the right-of-way, usually with bicycle lanes.[6]

Decisions about changing the width of sidewalks should be made on a street-by-street basis, taking into account cost, drainage, utility locations, heights of thresholds along the sidewalk, vegetation, and other factors. In general, sidewalks on quiet residential streets can be narrower than sidewalks on busy commercial streets.

Mailboxes, signs, posts, benches, trash cans, signal control boxes, and other sidewalk furniture should be placed in the curb zone so they do not interfere with pedestrian traffic or with the ability of pedestrians, including children and people in wheelchairs, to see cars and be seen by motorists at intersections.

It is also important that snow removal be kept in mind when deciding how much space to allot to cars and how much to give sidewalks. Unless snow is hauled away—an expensive proposition—it must be piled up on the side of the street, narrowing the road.

In commercial areas, wide sidewalks are usually important for pedestrians to feel comfortable. People tend to avoid the edges close to the street or to abutting buildings. Generally this means that the comfort zone is about 2 to 3 feet wide (see Appendix XII). People generally keep about 1.5 feet from objects in the curb zone—trees, signposts, etc. Ideally, the travel zone should be at least 8 feet wide, wide enough for two pairs of pedestrians to pass each other comfortably.

City sidewalks are important social spaces as well as travel routes, and space for people to stop and talk or to stand and watch must also be factored into calculations

6 Bicycle lanes offer advantages to pedestrians as well as cyclists. They help keep bicycles off sidewalks, they help channel and in some instances slow down automobile traffic, and they can make possible narrower turning radii at intersections, slowing turning traffic and decreasing the crossing distance for pedestrians. They also serve as a buffer between pedestrians and moving cars, which is especially helpful on streets without parking.

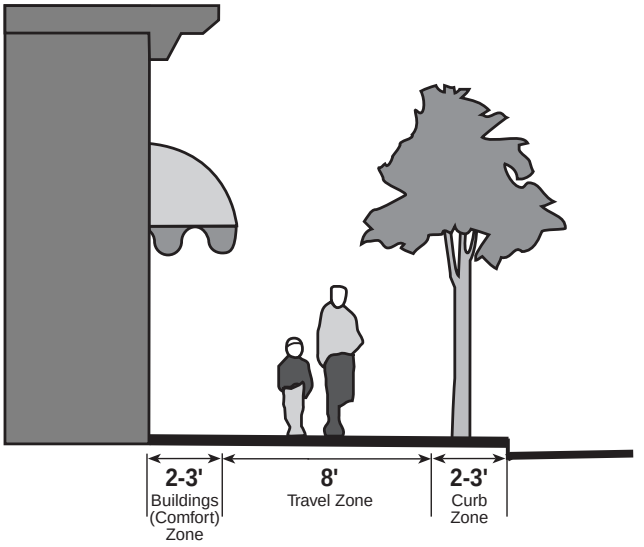

Figure 2: Typical Sidewalk Zones.

of optimal sidewalk widths, especially in commercial areas. Nonetheless, it is not the case that sidewalks should always be as wide as possible: "Having too much space is just as undesirable as having too little. Too much space makes a sidewalk seem 'empty,' because people are distributed over too large an area." [7] While some traditional pedestrian level of service (LOS) descriptions rate uncrowded sidewalks as "A" and extremely crowded sidewalks as "F," a level of "C" is often the most desirable for a sidewalk in a commercial area (see Appendix VII for details).

C. Sidewalk Construction

The City must construct sidewalks in compliance with the Americans with Disabilities Act (ADA). The ADA states that "surfaces of public sidewalks shall be stable, firm, and slip-resistant, and shall lie generally in a continuous plane with a minimum of surface warping." Wheelchair ramps must be made of concrete unless concrete is determined to be an "adverse effect" based on historical preservation regulations (see Appendix IX).

Sidewalk material—brick versus concrete—is a much-debated issue in Cambridge. Brick is warmer looking and generally considered more attractive, and it has historic associations.

Brick sidewalks are now set on a concrete base, instead of in stone dust, to minimize the heaving of bricks, which causes a trip hazard and noncompliance with the ADA.

Unevenness has been a major problem with old brick sidewalks, which were laid over stone dust. These sidewalks have tended to heave over time and are especially a problem for people in wheelchairs or people with visual or mobility difficulties.[8] Newer sidewalks of brick laid over concrete still have a somewhat uneven surface, and they can be slippery when wet, especially in the fall, when leaves cover them.

Concrete meets ADA specifications better than brick does. However, historical preservation concerns argue for the use of brick for sidewalks in certain locations. (See Appendix X for City sidewalk and curb design standards.)

Asphalt has also been used for City sidewalks in many locations where there is conflict with tree roots. Although most people do not like the appearance of asphalt, it has proven to be the best material to prevent the trip hazards these roots cause.

7 Project for Public Spaces, *The Effects of Environmental Design on the Amount and Type of Bicycling and Walking*, National Bicycling and Walking Study, FHWA Case Study No. 20, U.S. Dept. of Transportation, FHWA-PD-93-037 (April 1993), pp. 17-18.

8 These sidewalks did have the advantage of allowing rain water to seep into the soil, which benefits trees and other plants.

The City faces the problem of continuous sidewalks being constructed with various materials. Many abutters are very concerned about the material used for the sidewalk in front of their property, and some neighborhood sidewalks are a patchwork of brick and concrete. The policy currently used in these areas involves notifying residents that the existing material will be replaced unless the property owner informs the City otherwise. Property owners are notified that a request to change from concrete to brick cannot be implemented without payment for the additional cost of a brick sidewalk. In addition, in the past, private developers sometimes paved driveways with custom material and continued the paving to the street, adding to the patchwork. The City has implemented a site plan review process to standardize sidewalk material installed by developers.

Continued exploration of alternative paving materials is needed. The perfect material, which would be smooth, porous, attractive, slip-resistant, compatible with tree roots, relatively inexpensive, low maintenance, and easy to shovel, has not yet been identified.

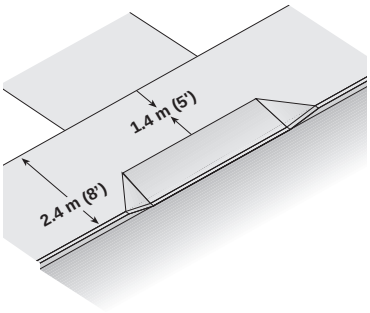

Figure 3: Sidewalk at Driveway.

D. Vehicular Curb Cuts

Vehicular curb cuts allow motor vehicles to cross sidewalks—the pedestrian pathway.[9] They create the potential for conflict with pedestrians or children playing. They also present potential tripping hazards for pedestrians, especially children and elderly people. As such, vehicular curb cuts should be kept to a minimum in number and width.

Vehicular curb cuts must be installed so that a minimum 3-foot path of travel (maximum 2% cross-slope) is maintained at the same grade across the curb cut as the sidewalk on either side of the curb cut.

In these areas the straight granite curb and concrete should be sloped down to meet the pavement. The adjacent sidewalk material should always be carried across the curb cut to alert drivers that they are crossing a sidewalk.

Wherever possible, vehicular curb cuts should be constructed to leave the pedestrian travel zone free of curbs and grade changes.

The maximum width of a curb cut in residential districts is 20 feet at the street line; in open space, business, and industrial districts, the maximum width is 30 feet. No more than one curb cut per lot is allowed for lots with less than 100 feet of frontage. For lots with over 100 feet of frontage, no more than one curb cut is allowed for every 100 feet or portion of 100 feet.

Driveway curb cuts cannot be closer than 25 feet from an intersection or 15 feet from a crosswalk.

E. Sidewalk Furniture and Amenities

Banners

Banners can be used to identify a special public location or area, or to announce or promote a special public event. When used appropriately, they can add visual interest to the streetscape, making the pedestrian experience more enjoyable.

9 The curb cuts discussed here are driveway openings, not the pedestrian ramps that make intersections accessible to people in wheelchairs and easier for many other pedestrians.

Banners must comply with Article 7.000 (Signs and Illumination) of the Cambridge Zoning Ordinance and with the Americans with Disabilities Act with respect to mounting height, clear space, and maximum projection.

Banners should be installed in the curb zone or building zone. They must not be installed where they would interfere with electric bus wires, or where they would obscure street signs, traffic signals, or any other directional or informational graphics.

Street light and bench in Central Square.

Benches

Benches are an important sidewalk amenity, providing pedestrians with an opportunity to sit and rest on a long walk, wait for a bus or to meet a friend, or read the paper.

Benches should only be installed on streets that have adequate sidewalk widths, and they should not interfere with curb ramps, fire hydrants, parking meters, or emergency access ways. Benches should be installed in the curb zone, a minimum of 2 feet from the curb, or in the building zone, as long as they do not obstruct the pedestrian path of travel.

The placement of benches should be site-specific, depending on circumstances. Shelter from the elements and an opportunity to watch pedestrians passing by are both desirable where possible. On streets with very wide sidewalks, benches may be oriented perpendicular to the right-of-way as long as they do not project into the pedestrian travel zone.

Benches should be considered wherever extra sidewalk width offers the opportunity for pocket parks, as has been done, for example, in Central Square.

Private property owners are encouraged to provide benches for use by the public on their land adjacent to the right-of-way.

Seating areas should include trash receptacles where possible.

City bicycle racks.

Bicycle Parking

Bicycle parking installed in the curb zone must be a minimum of 2 feet from the curb and cannot obstruct the path of travel. On narrow sidewalks, bicycle parking is oriented so the locked bicycle is parallel to the pedestrian traffic flow. On streets with very wide sidewalks, bicycle parking may also be oriented with locked bicycles perpendicular to the right-of-way as long as they do not project into the pedestrian travel zone.

Private property owners are also encouraged to provide bicycle parking for use by the public on their land adjacent to the right-of-way. Such parking should be installed so that locked bicycles do not project into the sidewalk. The standard city bicycle parking rings on posts are designed to prevent bicycles from falling and becoming an obstacle to walking.

Bollards

Bollards can be used to restrict vehicular access to pedestrian areas or to protect other street elements from damage. If executed with sensitivity to the surrounding architecture, bollards can be an attractive streetscape element.

Bollards installed in the curb zone should be a minimum of 2 feet from the curb.

Kiosks

Kiosks can be used to provide the public with information such as newspapers, maps, or directions. In business districts, kiosks can also serve as architectural landmarks.

Kiosks should only be installed on streets that have adequate sidewalk widths and must not interfere with curb ramps, fire hydrants, parking meters, or emergency access ways. Kiosks should be installed in the curb zone a minimum of 2 feet from the curb.

Like other street furniture, kiosks should not be installed in a bus stop zone.

Lighting

Good lighting for pedestrians makes many people feel safer at night.

Streetlights are installed in the curb zone, a minimum of 2 feet from the curb to avoid damage from trucks that pass close to the curb. Streetlights at intersections must be placed so that pedestrians are visible to motorists.

Pedestrian light fixtures should direct the light toward the sidewalk.

Trees should be pruned regularly to ensure that branches do not block streetlights.

Newsracks on Mass. Ave.

Newsracks

Newsracks can be useful sidewalk amenities. However, they have proliferated to the point where some are blocking sidewalks and crosswalks, obstructing access to buses, taxi stands, bicycle racks, and other facilities. In addition, many are not properly maintained and collect dirt and graffiti.

To deal with the proliferation of newsracks on the sidewalks, and to improve the appearance of the boxes, the City has established detailed standards for their placement and maintenance. The Department of Public Works is responsible for issuing permits for newsracks.

Planters

Plant material can help create a more attractive streetscape, adding color to the environment, improving air quality, and creating a buffer between pedestrians and automobiles.

Trees should be placed in planters only if they will not survive in the ground.

Planters should only be installed on streets that have adequate sidewalk widths and must not interfere with curb ramps, fire hydrants, parking meters, or emergency access ways. Planters should be installed in the curb zone a minimum of 2 feet from the curb, in the building zone, or within the property line.

The materials used to construct planters should be coordinated with the surrounding sidewalk and building materials.

Plant material should be designed and maintained not to extend beyond the edges of the planter until it has grown to a height of 7 feet above the ground.

Trees

Trees can help create a more attractive streetscape, providing visual relief year round and shade in summer, improving air quality, and creating a buffer between pedestrians and automobiles.

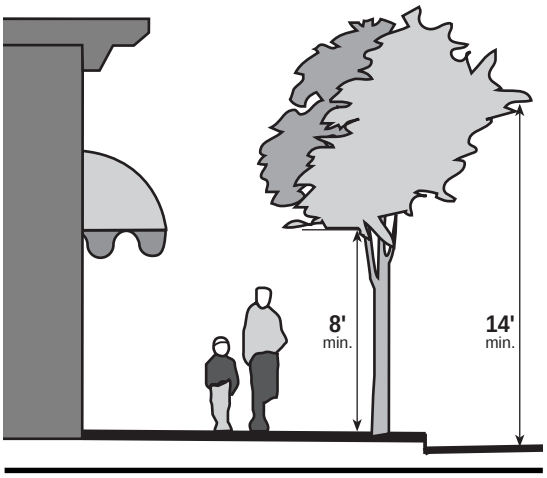

Figure 4: Tree Height Requirements.

Trees should only be planted on streets that have adequate sidewalk widths to maintain a minimum 3 foot path of travel. On sidewalks that are too narrow to accommodate trees without infringing on the pedestrian travel zone or utilities, residents may request that the City plant a tree in their yard near the sidewalk. Trees can be planted in curb extensions provided they do not interfere with the visibility of pedestrians waiting to cross the street or motorists turning corners. Trees should not be planted where they would be in the way of people getting on or off buses or interfere with the operation of utilities.

The selection of trees should be coordinated with the City arborist. Trees with root systems that won't become a trip hazard should be selected. Continued review will be conducted on types of trees and planting techniques to maintain accessible sidewalks.

Trees should be pruned to ensure that their branches do not interfere with pedestrian and vehicular visibility and movement. On the sidewalk side, 8 feet of clear space above the ground should be maintained; on the roadway side, 14 feet should be maintained.

City Standard Trash Can.

Trash Cans

Trash cans are a necessary element in the streetscape. The City's standard black metal trash can should be used.

Trash cans should be placed in the curb zone at a minimum of 2 feet from the curb, on private property, or in the building zone near a building entrance. Public trash cans should also be placed near food service establishments, bus stops, and seating areas. Public/private trash removal partnerships should be encouraged near food service establishments in particular, where it is not feasible or reasonable for the City to keep up with the volume of trash needing removal.

Utility Poles and Structures

The City's underground and overhead network of utility services greatly impacts sidewalks. Utility poles, traffic signals, and fire hydrants should be installed outside the pedestrian travel zone. Electrical boxes should be located on utility and traffic signal poles so they do not create unexpected hazards to pedestrians. Utility vaults and access boxes should be located outside the pedestrian travel zone and be constructed from non-slip materials that are flush with the sidewalk, in conformance with ADA requirements, preferably outside the City right-of-way. The preferred placement is on private property.